SECTION 5.0
ENVIRONMENTAL MITIGATION AND DESIGN FEATURES

5.0 MITIGATION

This chapter describes those measures that would be implemented to reduce or eliminate potential adverse impacts to the human and natural environments. Many of these measures have been incorporated as standard operating procedures for INS based on previous experience with the Border Infrastructure System project in Areas II, III, and IV. The mitigation measures are presented for each resource category that would be potentially affected. The proposed mitigation measures would be coordinated through the appropriate agencies and land managers/administrators prior to initiation of construction of the infrastructure system in Areas I, V, and VI.

As mentioned in Section 2, prior to commencing construction activities, the areas to be disturbed (including all access routes as presented previously in Figure 2-20) would be delineated with stakes or markers. Construction activities would be monitored by professional archeologists and biologists to ensure that sensitive resources are not impacted beyond the areas delineated. The biologists and/or archeologists will immediately notify the Facilities Supervisor, San Diego Sector, whenever any potential problems or violations are identified or appear to be imminent. The Facilities Supervisor has complete authority to halt all construction activities until the issue is resolved. In the event disturbance to sensitive resources, beyond those described in this EIS and/or subsequent permits, does occur, the Facilities Supervisor will notify the appropriate regulatory authorities to determine the appropriate course of action regarding restoration or mitigation of the impacts.

The Facilities Supervisor will also be responsible for maintaining the entire system, including, but not limited to, any revegetated slopes, other erosion control measures, drainage structures, lights, and road surfaces. Proper maintenance will help to ensure that additional, unforeseen impacts do not occur as well as improve the success and longevity of the proposed action.

After action reviews would be performed at the request of the land administrator or Federal regulatory agency. Significant problems identified during this review will be reported to the appropriate agencies and corrective actions will be implemented immediately. Measures to be implemented during subsequent activities, to avoid such problems, would be identified. Reports documenting these revisions would be forwarded to the appropriate Federal and state agencies for their information, if requested.

5.1 SOILS

Vehicular traffic associated with engineering and construction activities would remain on established roads to the maximum extent practicable. Previously disturbed routes and/or locations would be utilized for staging areas to the maximum extent practicable to reduce the soil disturbances. Anticipated locations of staging areas were presented in Figure 2-20. Heavy equipment would be restricted to established roads (see Figure 2-20) and no improvement to these roads is anticipated. Typically, heavy equipment would remain on-site for the duration and would access other areas via the project corridor.

Areas with highly erodible soils would be given special consideration during final design of the proposed infrastructure system to ensure incorporation of various compaction techniques, aggregate materials, wetting compounds, and revegetation to alleviate the potential for subsequent soil erosion. Erosion control measures such as waterbars, gabions, strawbales, and re-seeding with native species would be implemented during and after construction activities in accordance with the SWPPP, to be completed for the remaining portions of the project.

BMPs, that would be implemented during the construction phase include, but are not limited to the following measures:

1. The limits of fill-and-cut slopes shall be field surveyed and staked prior to construction.
2. Separate and stockpile topsoil for re-application.
3. Schedule major construction during the dry season when erosion potential is low.
4. Minimize the size of exposed area and the length of time of exposure through construction phasing, seeding and mulching.
5. Roughen finished slope surfaces to aid infiltration and thus reduce erosion. Methods to roughen include texturing with heavy equipment such as sheepfoot roller, and ripping and tilling perpendicular to the slope with ripper bars.
6. Trap sediment before it leaves the construction site by using silt fences, straw bales and temporary stilling basins.

The final engineering designs and SWPPP will identify specific measures/designs to be constructed that will provide permanent control of erosion and sedimentation to assure that the proposed action does not add to the existing problem of sedimentation in the Tijuana estuary or degrade downstream water quality. Permanent erosion control features that will be incorporated to the design will include, but are not limited to:

1. Apply jute fabric bonded fiber matrix, or other types of slope stabilization materials, on slope to hold soil, reduce impact of raindrops on soil material, hold seeds in place for germination and maintain soil moisture. The preferred cover shall be natural product, such as jute, so that it will degrade into the soil matrix.
2. Apply stockpiled native topsoil to finished slopes.
3. Seed the slopes with native vegetation before rainfall season.
4. Construct terraces or benches on steep and long slopes. Provide swale within the benches and line with riprap to slow water velocity and create energy dissipation. These swales should be directed to downdrains or rock-lined spillways to convey the storm water down slope in a safe and controlled manner to prevent slope erosion by concentrated flows.
5. Collect and direct runoff from top of slopes away from slope surfaces by using embankment curbs, spillways and downdrains. Provide energy dissipaters at the outlet of downdrains and spillways.
6. Provide sedimentation basins at toe of slopes to intercept and trap sediment before it leaves the project footprint. Maintenance of the sedimentation basin shall be the responsibility of the USBP and shall be accomplished on an as-needed basis, but not less than annually, to ensure that the basin will function properly.

Revegetation efforts would be needed to ensure long-term recovery of the area and to prevent significant soil erosion problems. The use of native seeds and plants to assist in the conservation and enhancement of protected species would be considered, as required by Section 7(a)(1) of the ESA. Borrow materials, if required, would be obtained from established borrow pits or from approved on-site sources within the project footprint.

5.2 AIR QUALITY

Proper and routine preventive maintenance checks and services of all heavy construction equipment, vehicles, generators, and other equipment would be implemented to ensure that air emissions are within the design standards of each piece of equipment. Construction sites will be kept wet, to the extent practicable, to reduce fugitive dust problems. Where practicable, drop lines from local electrical systems would be used as a substitute for generators.

The county recommends that additional air quality control measures be implemented to reduce exhaust emissions and fugitive dust. Specifically, during grading, clearing and construction on the project site, the control measures should include, but not be limited to the following:

a. Implement high wind dust control program for wind gusts exceeding 25 miles per hour as indicated by visible dust clouds generated on disturbed (cleared or graded) surfaces. High wind dust control should include:
    - Termination of operation of heavy equipment on unpaved surfaces until winds subside;
    - Application of water to unpaved surfaces with vehicle or equipment operations as needed; and,
    - Application of water or other dust control material (i.e., surfactants) to any previously graded surface if sustained dust emanation is visible from such surface.

b. Utilize measures to prevent dirt from being tracked, washed, blown, or otherwise conveyed to other areas, particularly paved roadways. This may involve, washing or sweeping construction access points on a routine basis to reduce dirt track-out.

c. Cover stockpiles of dirt to reduce the potential for fugitive dust.

d. Where feasible, on-road vehicles and off-road equipment should be turned off and subsequently restarted if the anticipated duration for idling is expected to exceed five minutes.

5.3 WATER RESOURCES

The proposed construction activities will require a SWPPP as part of the NPDES permit process. Since WUS, including wetlands, would be affected, early coordination by the USBP with the USACE, Los Angeles District, EPA, USFWS and appropriate state agencies has been initiated. The applicable Section 404/401 permit process shall be completed prior to initiation of the proposed construction activities within jurisdictional WUS, including wetlands. This process involves a Section 404(b)(1) evaluation to document the least environmentally damaging practicable alternative (LEDPA). The LEDPA analysis must also demonstrate the need to affect WUS, including wetlands, as well as the potential to satisfy the project purpose and need and compliance with IIRIRA. A copy of the Section 404(b)(1) evaluation is contained in Appendix G. Specific mitigation plans to compensate for wetland/WUS losses will be developed as part of the permitting process. Some conceptual ideas for mitigation/compensation of these losses are discussed in the following subsection. Table 5-1 presents the wetlands/WUS losses associated with the preferred alignment of the

Table 5-1.
Jurisdictional Wetland Impacts of the Proposed Action Alternative and Recommended Mitigation Ratios

Wetland Type	Impact	Mitigation Ratio[1]	Proposed Acres to be Replaced
Southern Willow Scrub	2.5	2:1	5.0
Mulefat Scrub	4.2	3:1	12.6
Coastal Salt Marsh	1.0	3:1	3.0
Disturbed Coastal Salt Marsh	0.5	1.5:1	0.75
Tamarisk Scrub	0.5	0.5:1	0.25
WUS	4.1	1:1	3.3

[1] except where occupied by Federally protected species.

Proposed Action Alternative and the recommended mitigation ratios. It should be noted that the acreages presented in this table are those that will be directly impacted by the construction footprint (permanent and temporary). The areas between the existing primary fence and the southern toe of the road and secondary fence construction footprint would not be disturbed by dredge and fill activities and, thus, do not require permitting under the CWA. Therefore, these are the wetland impacts that will be presented in the Section 404/401 permit applications. The impacts discussed in Chapter 4 included all the areas between the primary fence and the northern toe of the construction footprint to provide a worst-case scenario analysis.

5.4 BIOLOGICAL RESOURCES

Several measures/conceptual plans were proposed in the Draft EIS to solicit input regarding mitigation or compensation of potential losses to the biological resources within the project area. While no public input was received regarding the preferred method of mitigation (other than implementation of the No Action Alternative), several agencies and organizations requested additional detailed information regarding potential mitigation measures. A conceptual plan for mitigation of jurisdictional wetlands and areas occupied by or designated as critical habitat for least Bell's vireo, coastal California gnatcatcher, and Quino checkerspot butterfly is presented in Appendix G. This is a concept only; the final plan must undergo extensive review by and coordination with the appropriate regulatory agencies. The USFWS has agreed to this concept as indicated in the BO contained in Appendix H.

The following paragraphs discuss other plans and measures proposed by INS to mitigate for potential losses and impacts. This plan will undoubtedly undergo additional scrutiny and refinement during the permitting process. It should be emphasized that INS has no statutory requirements to mitigate for upland habitats that are not occupied by Federally listed species or are contained within designated critical habitat. Final mitigation ratios and plans for compensation of occupied habitat were negotiated with the USFWS under the Section 7 consultation process and shall be negotiated with the USACE, Los Angeles District, EPA, and California Coastal Commission (in coastal zone) for wetland impacts. These agencies will coordinate the review process with other state and Federal agencies, as appropriate.

Two primary methods of offsetting impacts to protected species and wetlands are planned: (1) land transfer/preservation and (2) restoration of disturbed lands. These approaches are briefly discussed in the following subsections.

The total amount of each habitat type (exclusive of disturbed/developed lands) that would be impacted by the Proposed Action Alternative is displayed in Table 5-2. The proposed replacement ratios for the various impacts to habitats area are also presented in this table. The areas where the impact occurs and the proposed compensation/mitigation would be implemented is also presented in Table 5-2. This quantification is presented for the preferred alignment of the proposed alternative only.

The total amount of each habitat that will be impacted under the proposed action would not necessarily be mitigated due to the degraded state of the communities in particular areas (i.e., some areas are more disturbed than others and are likely not fully functional habitats). For instance, the sage scrub habitats at Tin Can Hill are disturbed due to frequent burning and invasive, introduced grass species, thus the sage scrub habitats do not appear to function fully as protected species habitat (Ogden 1999b) and have limited wildlife value. Much of this area does not provide the primary constituent elements for Quino checkerspot butterfly or coastal California gnatcatcher specified for critical habitat designation. The acreage proposed for replacement is based on several site visits and species-specific survey data. It should be emphasized again that INS is not statutorily required to compensate for upland habitats that are not occupied by Federally protected species or encompassed by designated critical habitat. Thus, the mitigation ratios presented previously in Table 5-2 are considered to be liberal, even though they might be below what is recommended in the MSCP or by the County of San Diego for commercial and private development.

5.4.1 Land Transfer / Preservation

This conservation measure would involve the purchase of lands currently in private ownership for the purpose of long-term conservation and/or transfer or preservation of lands currently owned by the INS for permanent conservation. Lands that would be acquired for replacement of native habitats include areas that are considered disturbed, old field, or that may fall within the project boundaries where habitat would be expected to remain intact. Approximately 145 acres are currently owned by the INS near Spring Canyon and Arnie's Point (Area III) as shown in Figure 5-1. These lands, which contain a large vernal pool complex as well as habitat that could be managed for gnatcatcher and Quino checkerspot butterfly habitat, are intended to be transferred to a resource agency for possible inclusion in the MSCP or other long-term preservation purposes. If transfer is not possible, INS shall set aside this land for permanent conservation. A total of 110 acres, consisting of disturbed and undisturbed coastal sage scrub and native grassland communities and disturbed/barren lands would be counted as mitigation or compensation. The remaining 35 acres, which includes vernal pool complexes and riparian scrub communities, would not contribute to the compensation totals, since these communities are integrally connected to other mitigation programs. Of the 110 acres, 37 acres are disturbed and denuded areas that would have to be restored to coastal sage scrub prior to transfer or conservation of the lands.

In addition to these lands, the INS/USBP expect that the entire parcel of private land on Lichty Mesa (Area VI) will have to be purchased in order to construct the Border Infrastructure System and avoid an economic remnant for the current landowner. The Border Infrastructure System footprint will only require about 5 acres of the parcel. The remaining 9.6 acres can be transferred or conserved as additional compensation. These 9.6 acres are comprised of maritime succulent scrub (4 acres) and disturbed and undisturbed coastal salt marsh (5.6 acres) communities.

Table 5-2. Mitigation Replacement Amounts for the Proposed Action

Habitat Type	Total Acres Impacted	Conservation Ratio	Proposed Replacement Acreage
Coastal Sage Scrub (CSS)	26.3	3:1	78.9
Disturbed CSS	9.3	1:1	9.3
Native Grassland	16.3*	3:1	48.9
Southern willow scrub	2.57	3:1	7.71
Mulefat scrub	4.2	3:1	12.6
Unvegetated Waters of U.S.	3.3	1:1	3.3
Maritime succulent scrub (MSS)	13.1	3:1	39.3
Disturbed MSS	0.8	2:1	1.6
Southern Mixed Chaparral	9.2	2:1	18.4
Disturbed/barren soil in Critical Habitat	11.6	1:1	11.6
Total	**96.3**		**231.6**

*includes grasslands in eastern end of Area II within QCB critical habitat

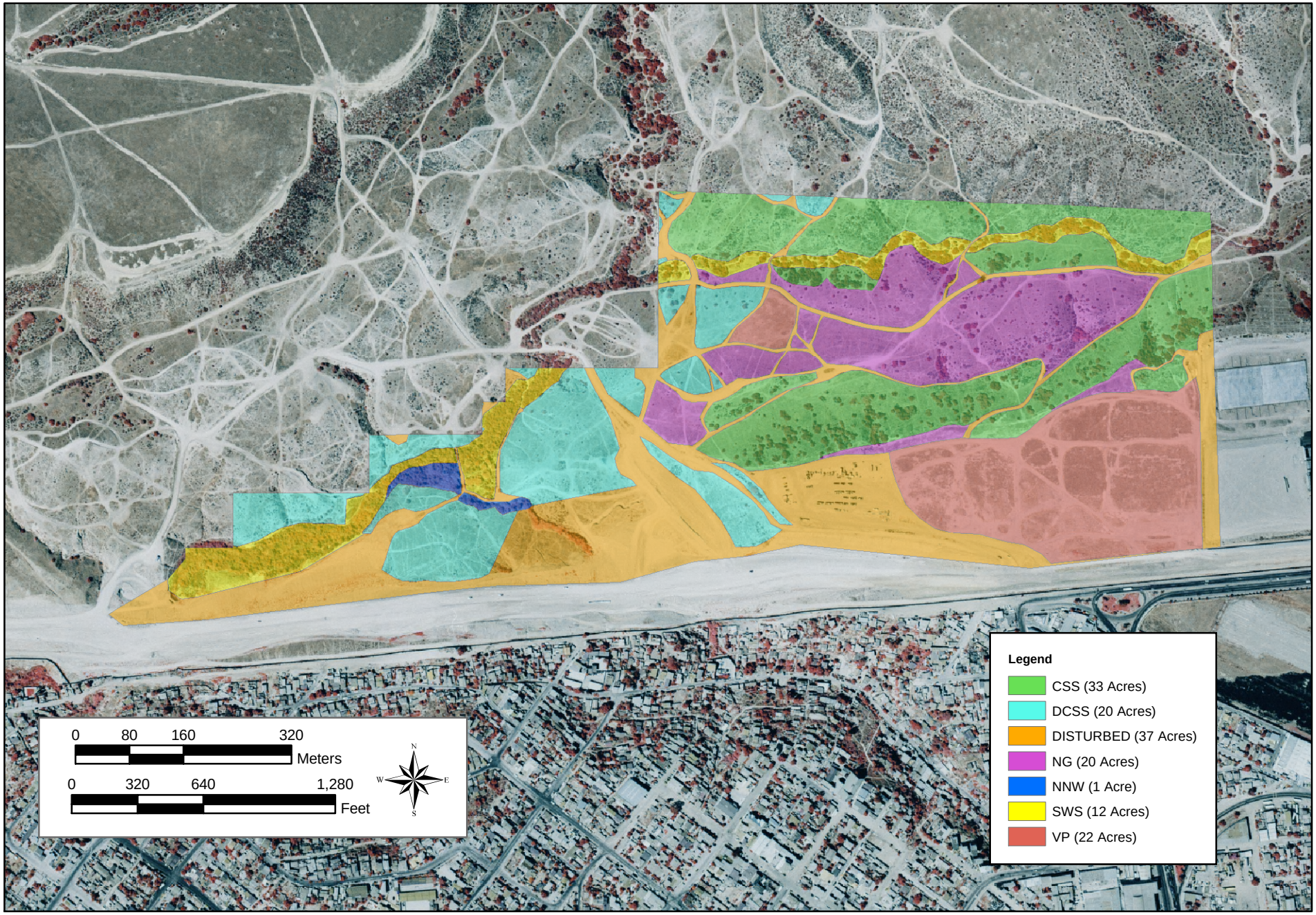


Figure 5-1: INS Spring Canyon Mitigation Site

gsrc / GULF SOUTH RESEARCH CORPORATION

Date: May 2003

5.4.2 Revegetation/Restoration

The INS/USBP has also committed to abandoning, and possibly re-vegetating, approximately 42 miles of roads in the Spring Canyon Area (Area III), and 43 miles of roads in Areas I, IV and VI. The INS/USBP would re-vegetate all abandoned roads, provided permission is granted from the landowner to do so. This mitigation measure would convert about 145 acres of bare ground to coastal sage scrub and grassland habitat. It would also eliminate much of the habitat fragmentation that has resulted from these roads. These measures would be implemented in addition to the land transfer/conservation measures discussed previously. In addition, more roads could be abandoned/re-vegetated in the future as operational needs are reassessed. The majority of these roads, however, are located on private lands, thus there is a possibility that permission cannot be obtained to re-vegetate these roads. About 16 miles (24 acres) of roads are on public lands and INS/USBP are confident that these roads could be restored to coastal sage scrub and maritime succulent scrub upon completion of the Border Infrastructure System. The roads which would be abandoned are presented in Figures 5-2 through 5-4.

The INS/USBP has committed to restoring additional lands on Spooner's Mesa, west of Smuggler's Gulch, to maritime succulent scrub and maritime chaparral. This effort will provide the remaining compensation obligations to these community types (37 and 18 acres, respectively). The INS/USBP would also restore a 18-acre site parallel to and south of the Tijuana River to compensate for the losses of mulefat scrub and southern willow scrub communities. Both of these sites and efforts would be consistent with the long-range plans for the Tijuana Valley Regional Park. These two proposed mitigation sites are presented in Figures 5-5 and 5-6, respectively.

The INS/USBP will also coordinate with the Bureau of Land Management to conduct a noxious weed eradication program along patrol roads within the Otay Wilderness Area and surrounding BLM lands. These efforts will be conducted to compensate for impacts to Quino checkerspot butterfly critical habitat within Area 1. The eradication program would be conducted for 5 years.

As discussed previously, the slopes on the north side of the Border Infrastructure System would be revegetated with native species, as recommended by Section 7(a)(1) of the ESA. Revegetation on similar slopes in the area has proven successful, even under natural conditions. For instance, the Encinada Highway that parallels the border in Mexico required a substantial cut-and-fill project at Smuggler's Gulch about 0.25 miles south of the project corridor. These slopes were not stabilized, but have naturally succeeded to a coastal sage scrub community. The INS would actively vegetate and monitor the slopes constructed by the Proposed Action to ensure that erosion is abated and habitat creation is successful. Such measures could provide large amounts of habitat. For example, the north slope of the proposed Smuggler's Gulch embankment alone could provide 37 surface acres of coastal sage shrub habitat.

5.4.3 Scheduling and Avoidance

Pre-construction surveys will be conducted for migratory birds, and in particular, least Bell's vireo, coastal California gnatcatcher, California least tern, western snowy plover, and southwestern willow flycatcher. Construction activities would be restricted, to the maximum extent practicable, to avoid the nesting seasons of migratory birds, in compliance with the Migratory Bird Treaty Act.

Impacts to state listed species would also be avoided to the maximum extent practicable. If appropriate, mitigation measures would be considered, especially if they can be incorporated into other mitigation plans. For example, Section 4.3.6 reported that 47

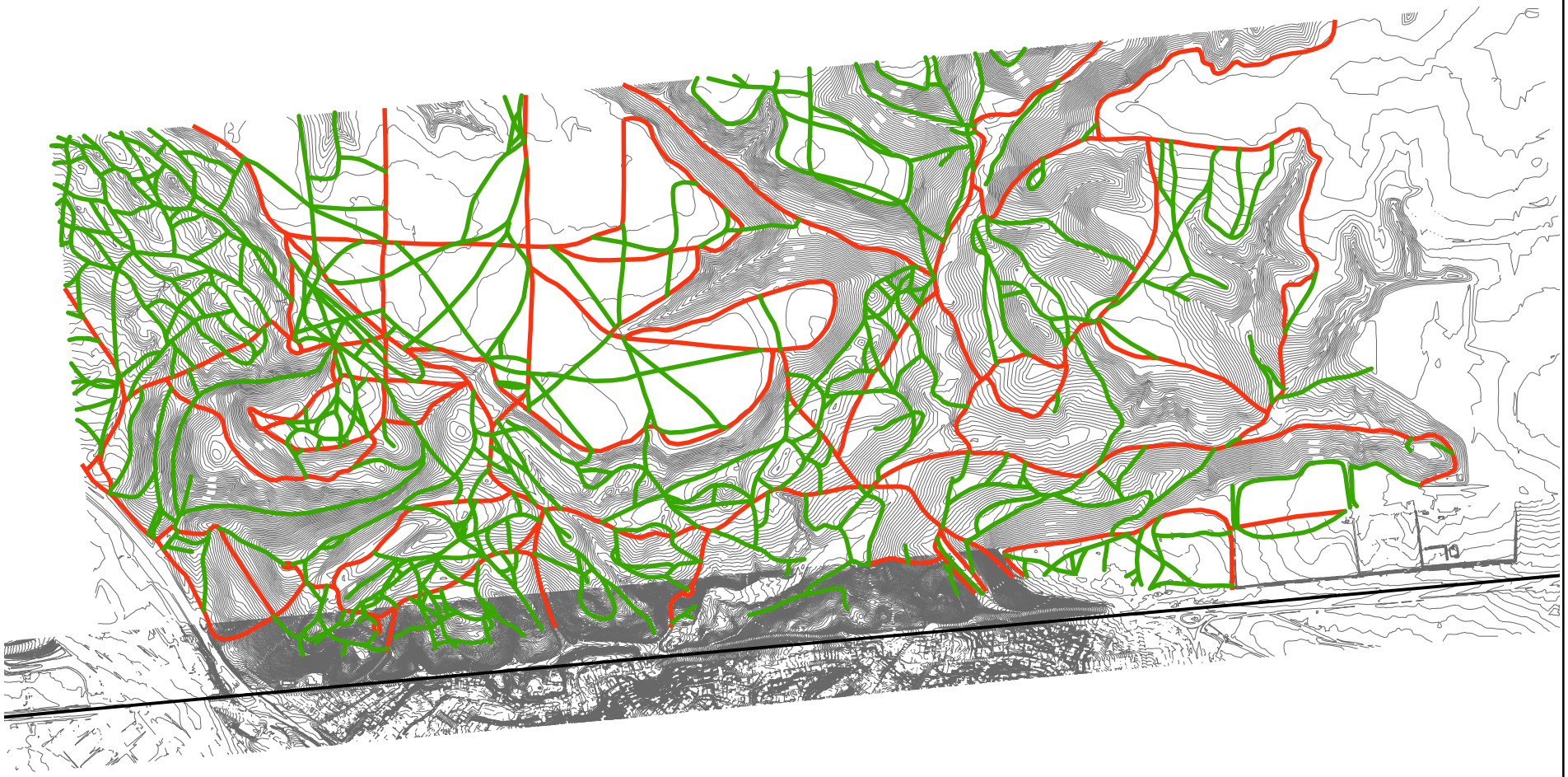
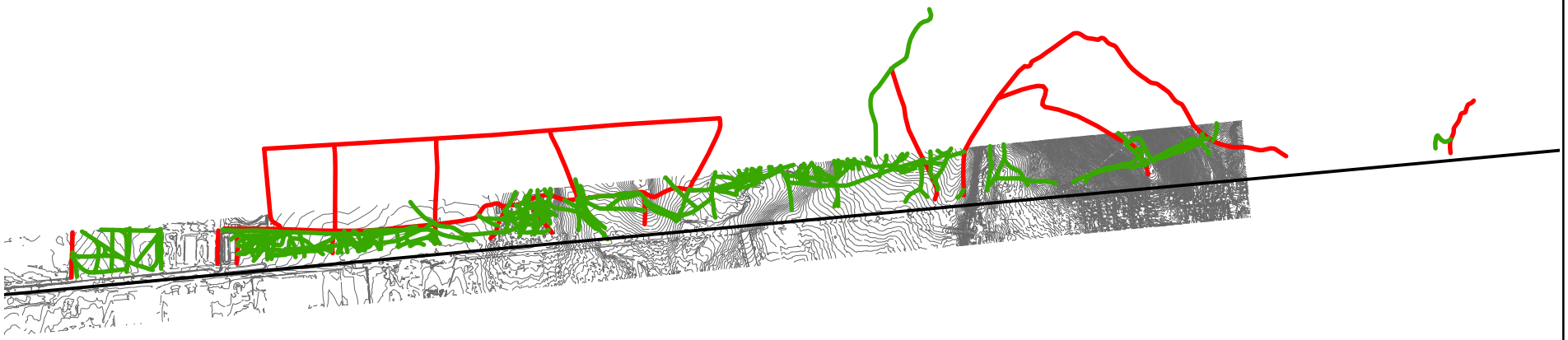


Figure 5-2: USBP Roads to be Abandoned in Spring Canyon Area

GSRC / GULF SOUTH RESEARCH CORPORATION

Date: July 2003



0 0.15 0.3 0.6 Miles

0 325 650 1,300 Meters

1:24,197

Roads Border Patrol will continue to use

Roads Border Patrol would abandon

Contours

International Border

Figure 5-3: USBP Roads to be Abandoned in Areas I and II

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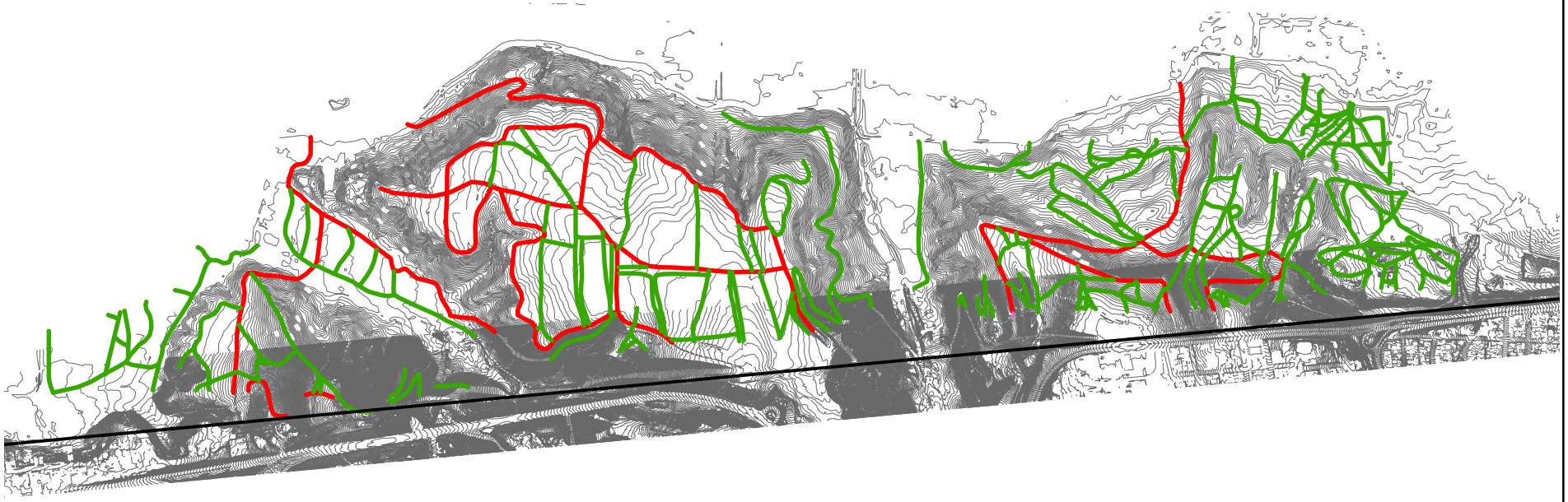
Date: July 2003



0 0.125 0.25 0.5 Miles

0 255 510 1,020 Meters

N W E S

1:18,853

Roads Border Patrol will continue to use
Roads Border Patrol would abandon
Contours
International Border

Figure 5-4: USBP Roads to be Abandoned in Areas V and VI

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Date: July 2003

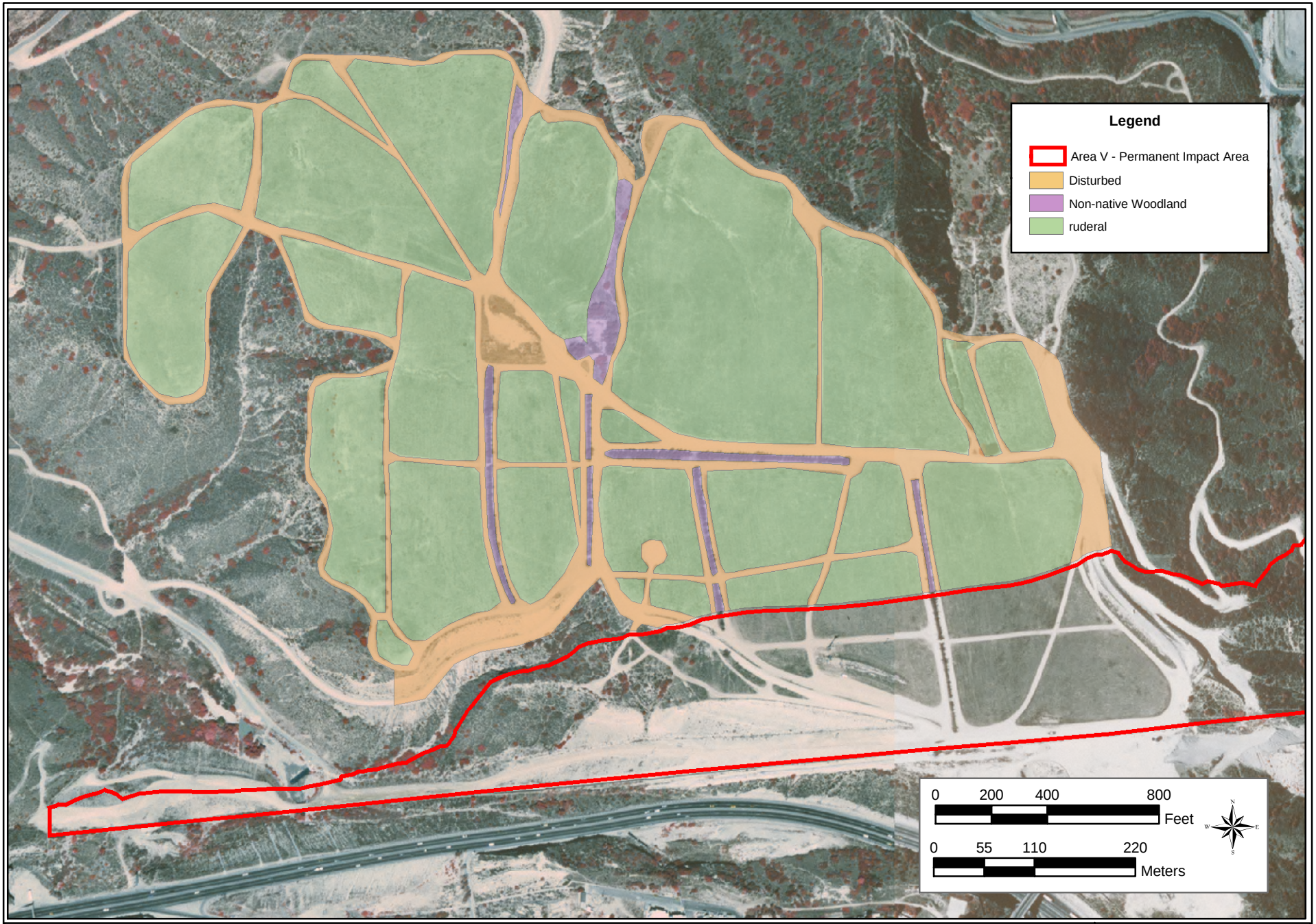

Figure 5-5. Areas Available for Mitigation at Spooner's Mesa

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Date: July 2003

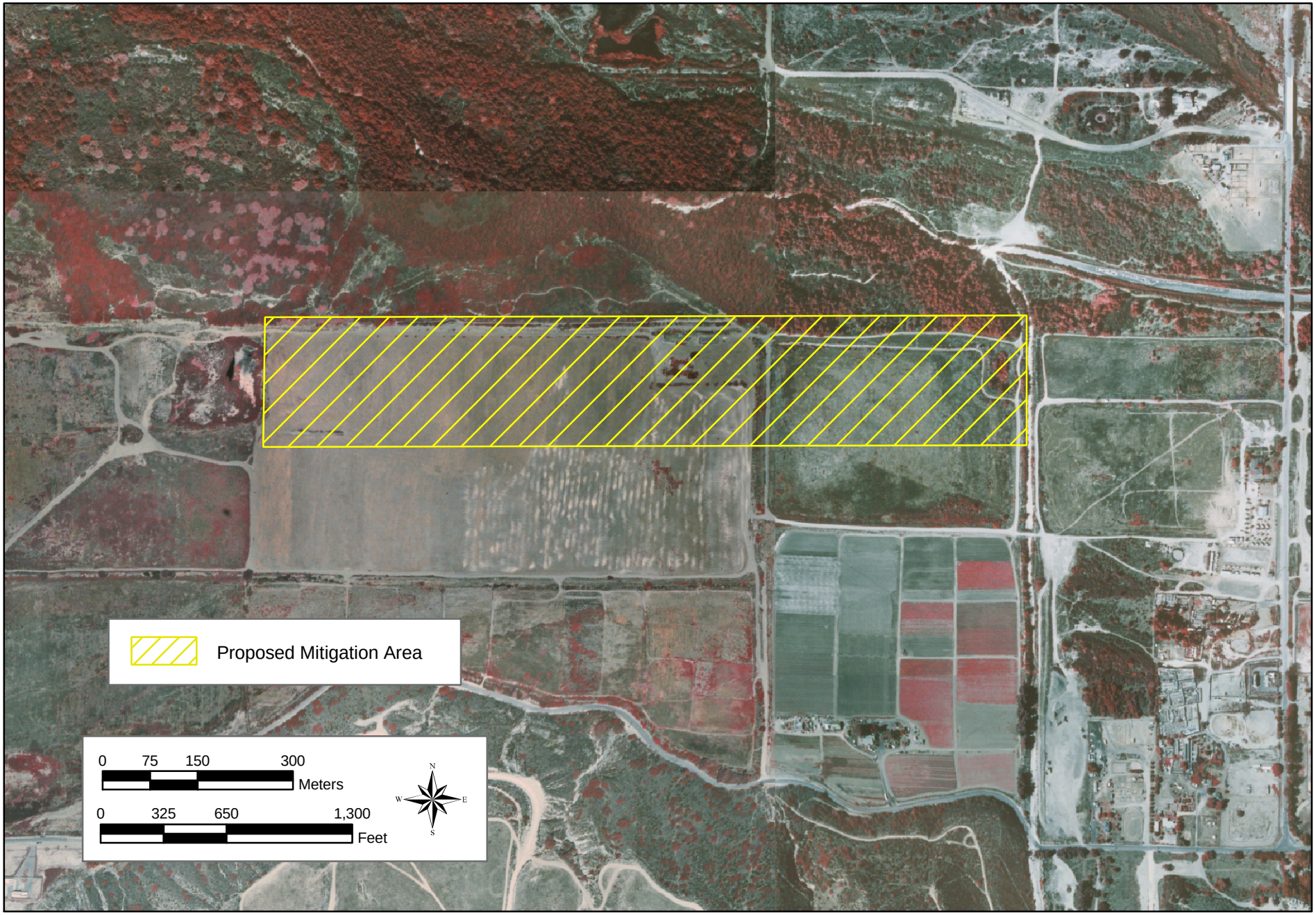

Figure 5-6. Potential Tijuana Valley Mitigation Area

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Date: July 2003

specimens of Baja California birdbush would be impacted by the proposed border infrastructure system. These specimens could be salvaged and relocated north of the project area and/or to the INS mitigation site. Under the latter scenario, the soils and other biotic and abiotic conditions would have to be evaluated to ensure that the relocation is successful. A copy of a conceptual salvage plan for the birdbush is included as Appendix G.

5.4.4 Lighting Design

The proposed lighting for the entire 14-mile project corridor has been designed to ensure that no increase to ambient light conditions would occur in areas to the north of the tertiary fence. Low pressure sodium vapor lights were originally planned to be installed on the north side of the light standards to provide illumination of the patrol road. These were eliminated partially because of the potential effects to wildlife and their habitats to the north. The proposed design now produces a maximum of 0.1 foot candles of light at the northern toe of the maintenance road which is similar to a bright moonlight. Consequently, there would not be an increase to the ambient light conditions north of the proposed project footprint.

The lighting system was also designed to minimize light trespass into Mexico. The mitigation measures such as the lighting fixture optics, aiming, and pole height and spacing were taken into consideration in areas where the top of the primary fence was lower than the base elevation at the proposed light pole.

High pressure sodium lights were included in the design to eliminate or reduce sky glow and area of brightness. Full color spectrum illumination was considered but eliminated due to potential effects on sea turtles and migratory birds.

5.4.5 Noise Abatement

Potential noise effects to Federally protected bird species would be mitigated through pre-construction surveys, avoidance (to the extent practicable) of breeding/nesting seasons, and/or the erection of temporary noise barriers to ensure that construction noise does not increase ambient conditions during breeding/nesting seasons. Construction traffic during the breeding season of least Bell's vireo and coastal California gnatcatcher would be routed to access roads east and west of Smuggler's Gulch to avoid noise impacts to these species.

5.5 SOCIOECONOMICS

No residential or commercial/industrial facilities would be displaced by the proposed action. All construction activities, regardless of the area, would be limited to daylight hours only. Construction activities in Border Field State Park would be restricted to non-holiday weekdays only to reduce/eliminate adverse noise effects on visitors. Safety buffer zones would be designated around all construction sites to ensure public health and safety. Different designs of the fences and entrance to the Border Field State Park at Monument Mesa are currently being coordinated with the California Department of Parks and Recreation and the California Resources Agency. Some of these conceptual designs are presented in Appendix J. This coordination could provide a more aesthetically pleasing design and/or enhance the functionality of the park. These measures also include planting native shrubs (e.g., chamise or mulefat) north of the tertiary fence to conceal the border infrastructure system.

Construction materials will be purchased from local vendors/suppliers whenever practicable to enhance local economies.

5.6 CULTURAL RESOURCES

Potential adverse impacts to historic properties have been mitigated through a policy of site avoidance and/or testing. Further testing of cultural resources that are deemed to be potentially eligible for NRHP-listing would be required prior to construction, consequently, implementation of the Border Infrastructure System would have no effect on historic properties. Mitigation measures that could be used for any sites discovered during construction activities, when approved by SHPO, include, but are not limited to, data recovery, burial (capping) of the site with gravel or other aggregates, and use of professional archeologists as monitors during the maintenance operations.

All construction activities shall be at least two feet away from the international boundary to avoid impacts to historical boundary monuments and other demarcations. Near each permanent boundary monument, strict construction precautions would be implemented to avoid potential damage to these items.

5.7 AESTHETIC RESOURCES

Potential effects to aesthetic resources include the revegetation and restoration of approximately 100 miles of road as outlined in Section 5.4.3. In addition, slopes will be re-seeded with native vegetation in order to stabilize these slopes against erosion. This will further mitigate effects to the local viewshed. Area I has a Draft planning document, *East Otay Mesa Specific Plan Amendment – Sub-Area 1* (County of San Diego 2002), which provides guidelines that outline how structures should be built in order to reduce adverse impacts to the viewshed. This document would be used in areas, where practical, in order to determine appropriate landscaping and building techniques. Landscaping with native vegetation communities, where practical, would also be used to alleviate adverse visual impacts.